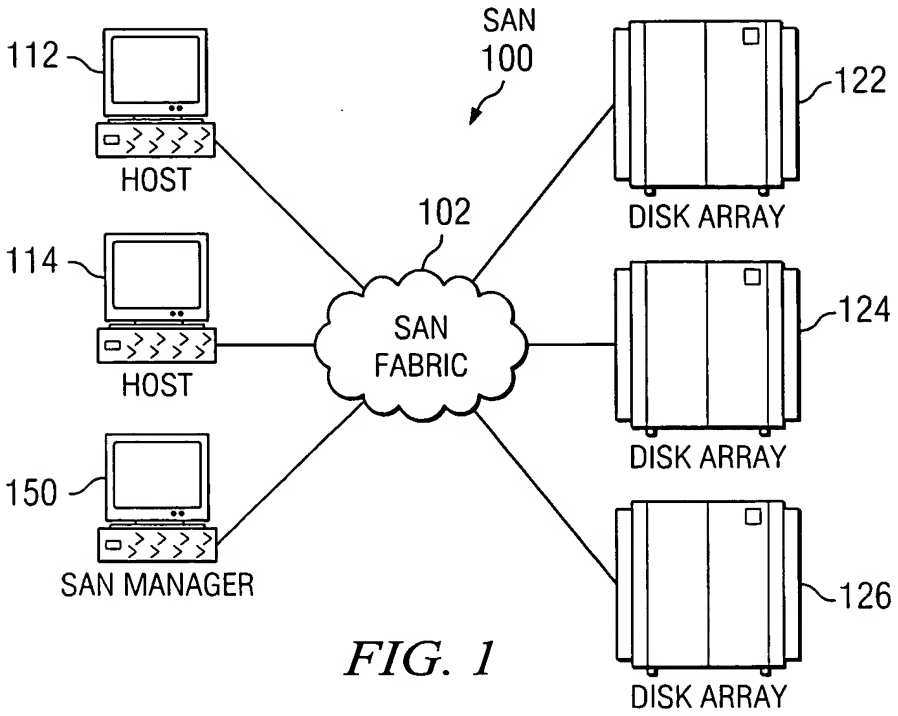
SAN
100
112
HOST
114
HOST
150
SAN MANAGER
102
SAN
FABRIC
122
DISK ARRAY
124
DISK ARRAY
126
DISK ARRAY

FIG. 1

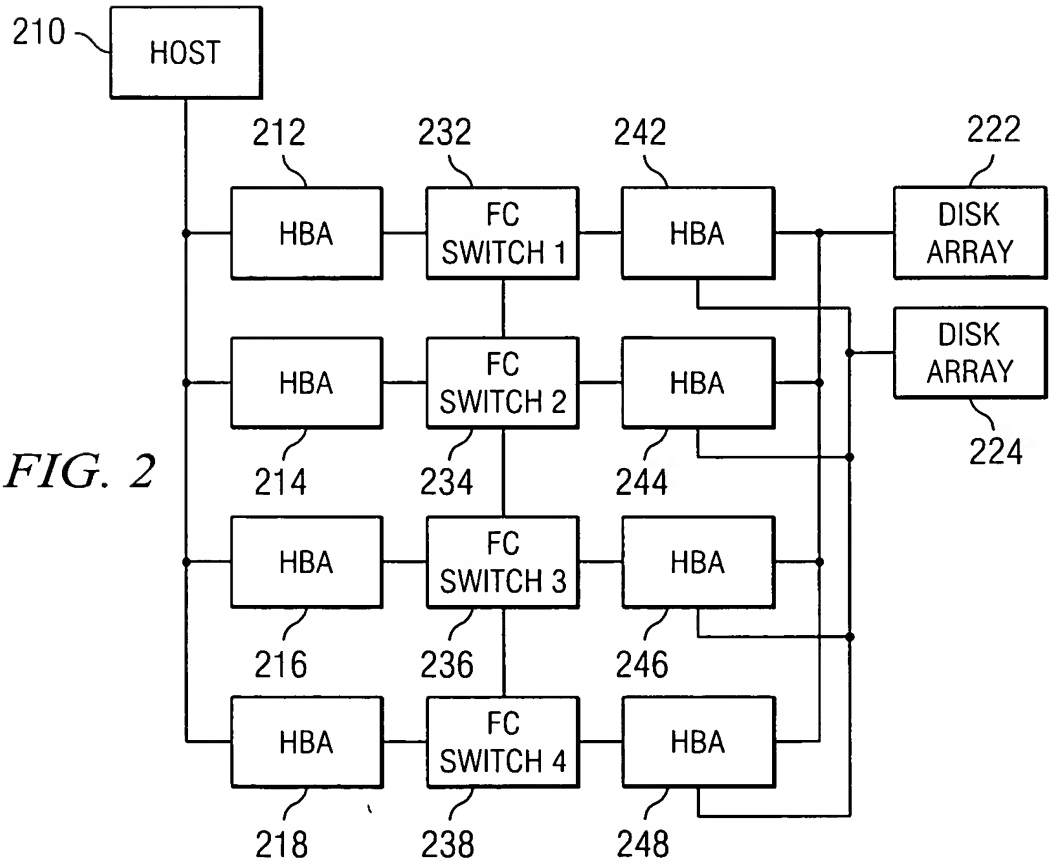
210
HOST
212
232
242
222
HBA
FC
SWITCH 1
HBA
DISK
ARRAY
HBA
FC
SWITCH 2
HBA
DISK
ARRAY
214
234
244
224
HBA
FC
SWITCH 3
HBA
216
236
246
HBA
FC
SWITCH 4
HBA
218
238
248

FIG. 2

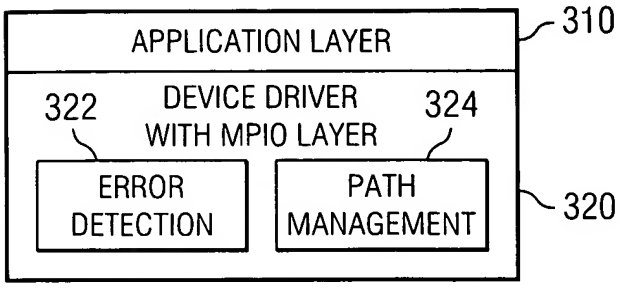

FIG. 3

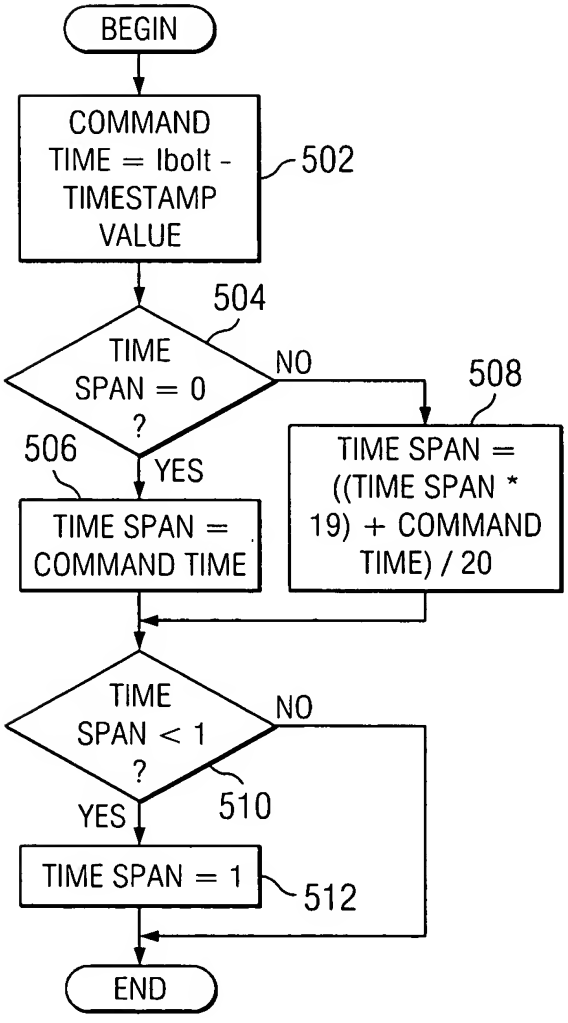

FIG. 5

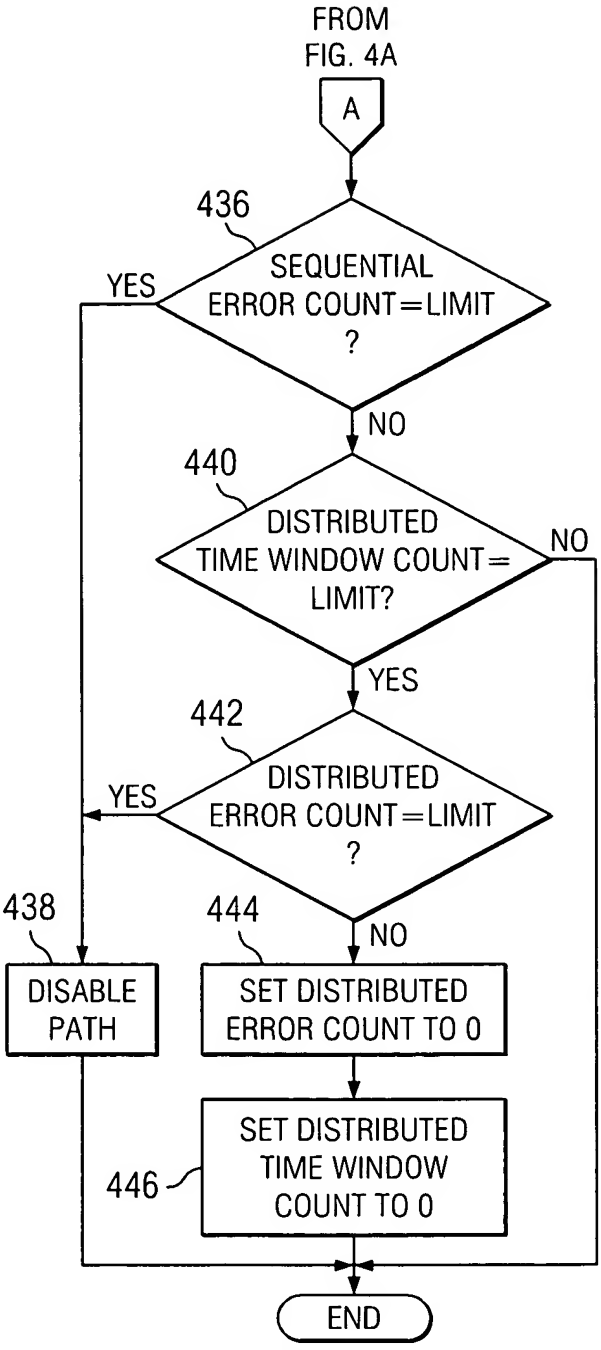

FIG. 4B

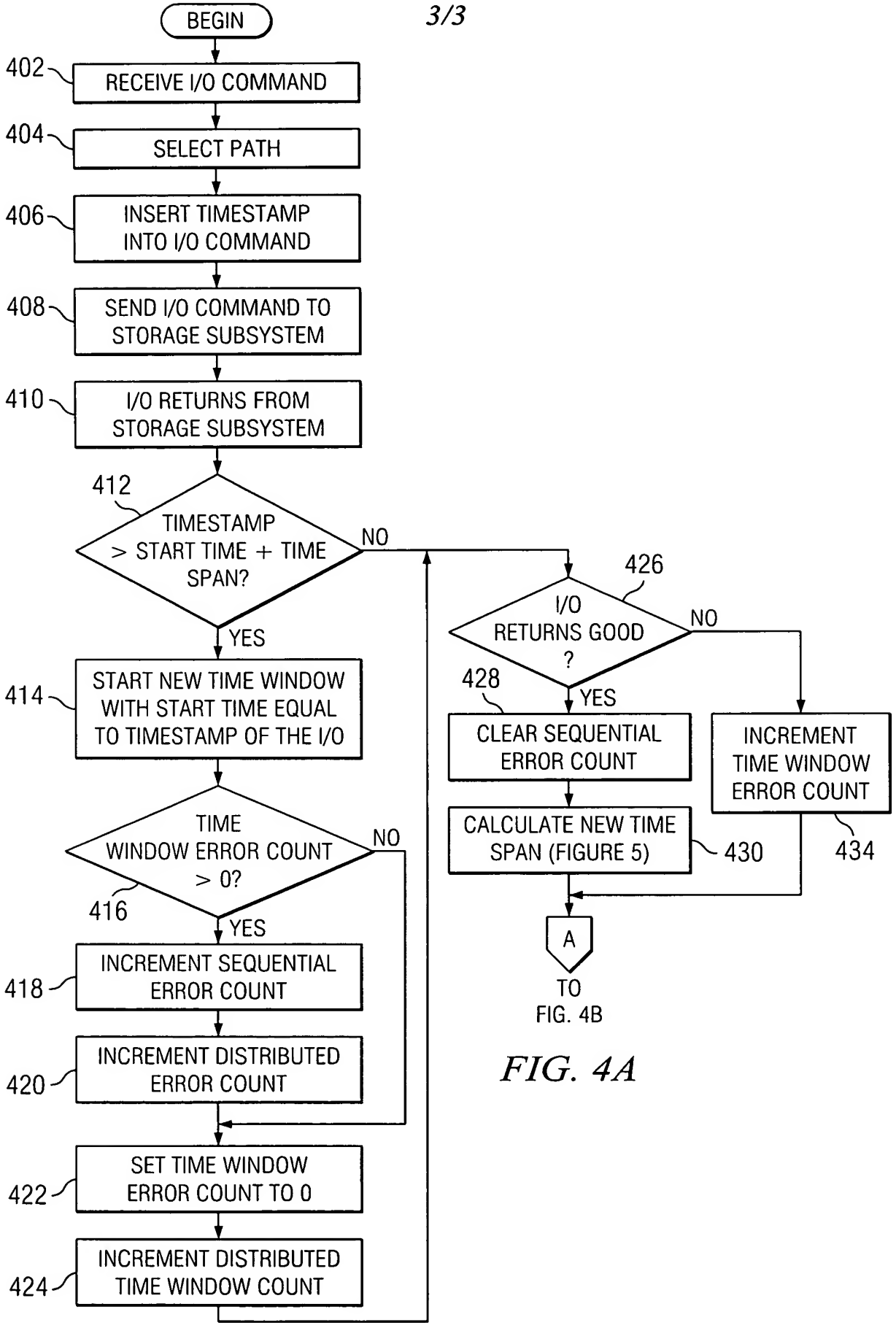
BEGIN
402
RECEIVE I/O COMMAND
404
SELECT PATH
406
INSERT TIMESTAMP INTO I/O COMMAND
408
SEND I/O COMMAND TO STORAGE SUBSYSTEM
410
I/O RETURNS FROM STORAGE SUBSYSTEM
412
TIMESTAMP > START TIME + TIME SPAN?
NO
YES
414
START NEW TIME WINDOW WITH START TIME EQUAL TO TIMESTAMP OF THE I/O
TIME WINDOW ERROR COUNT > 0?
NO
416
YES
418
INCREMENT SEQUENTIAL ERROR COUNT
420
INCREMENT DISTRIBUTED ERROR COUNT
422
SET TIME WINDOW ERROR COUNT TO 0
424
INCREMENT DISTRIBUTED TIME WINDOW COUNT
426
I/O RETURNS GOOD ?
NO
428
YES
CLEAR SEQUENTIAL ERROR COUNT
CALCULATE NEW TIME SPAN (FIGURE 5)
430
INCREMENT TIME WINDOW ERROR COUNT
434
A
TO FIG. 4B

FIG. 4A